

AMENDMENTS TO THE CLAIMS

The following is a complete listing of revised claims with a status identifier in parenthesis.

LISTING OF CLAIMS

1-54. (Cancelled)

55. (New) A piston-chamber combination comprising an elongate chamber which is bounded by an inner chamber wall and comprising a piston means in said chamber to be sealingly movable relative to said chamber at least between first and second longitudinal positions of said chamber,

said chamber having cross-sections of different cross-sectional areas at the first and second longitudinal positions of said chamber and at least substantially continuously differing cross-sectional areas at intermediate longitudinal positions between the first and second longitudinal positions thereof, the cross-sectional area at the first longitudinal position being larger than the cross-sectional area at the second longitudinal position,

said piston means being designed to adapt itself and said sealing means to said different cross-sectional areas of said chamber during the relative movements of said piston means from the first longitudinal position through said intermediate longitudinal positions to the second longitudinal position of said chamber,

wherein the piston means comprises:

a plurality of at least substantially stiff support members rotatably fastened to a common member,

said support members embedded in elastically deformable means, supported by said support members, for sealing against the inner wall of the chamber said support members being rotatable between 10° and 40° relative to the longitudinal axis of the chamber.

56. (New) A combination according to claim 55, wherein the support members are rotatable so as to be at least approximately parallel to the longitudinal axis.

57. (New) A combination according to claim 55, wherein the common member is attached to a handle for use by an operator, and wherein the support members extend, in the chamber, in a direction relatively away from said handle.

58. (New) A combination according to claim 55, further comprising means for biasing the support members against the inner wall of the chamber.

59. (New) A piston-chamber combination comprising an elongate chamber which is bounded by an inner chamber wall and comprising a piston means

in said chamber to be sealingly movable relative to said chamber at least between first and second longitudinal positions of said chamber,

said chamber having cross-sections of different cross-sectional areas at the first and second longitudinal positions of said chamber and at least substantially continuously differing cross-sectional areas at intermediate longitudinal positions between the first and second longitudinal positions thereof, the cross-sectional area at the first longitudinal position being larger than the cross-sectional area at the second longitudinal position,

said piston means being designed to adapt itself and said sealing means to said different cross-sectional areas of said chamber during the relative movements of said piston means from the first longitudinal position through said intermediate longitudinal positions to the second longitudinal position of said chamber, wherein the piston means comprises an elastically deformable container comprising a deformable material.

60. A combination according to claim 59, wherein the deformable material is a fluid or a mixture of fluids, such as water, steam and/or gas, or a foam.

61. (New) A combination according to claim 59, wherein, in a cross-section through the longitudinal direction, the container, when being positioned at the first longitudinal position of the chamber, has a first shape

which is different from a second shape of the container when being positioned at the second longitudinal position of said chamber.

62. (New) A combination according to claim 61, wherein at least part of the deformable material is compressible and wherein the first shape has an area being larger than an area of the second shape.

63. (New) A combination according to claim 62, wherein the deformable material is at least substantially incompressible.

64. (New) A combination according to claim 59, wherein the container is inflatable.

65. (New) A combination according to claim 59, wherein the piston means comprises an enclosed space communicating with the deformable container, the enclosed space having a variable volume.

66. (New) A combination according to claim 65, wherein the volume is manually adjustable.

67. (New) A combination according to claim 65, wherein the enclosed space comprises a spring-biased pressure tuning piston.

68. (New) A combination according to claim 65, further comprising means for defining the volume of the enclosed space so that the pressure of fluid in the enclosed space chamber relates to the pressure acting on the piston means when being positioned at the second longitudinal position of the chamber.

69. (New) A combination according to claim 68, wherein the defining means are adapted to define the pressure in the enclosed space at least substantially identical to the pressure acting on the piston means when being positioned at the second longitudinal position of the chamber.

70. (New) A combination according to claim 55, wherein the cross-sections of the different cross-sectional areas have different cross-sectional shapes, the change in cross-sectional shape of the chamber being at least substantially continuous between the first and second longitudinal positions of the chamber, wherein the piston means is further designed to adapt itself and the sealing means to the different cross-sectional shapes.

71. (New) A combination according to claim 70, wherein the cross-sectional shape of the chamber at the first longitudinal position thereof is at least substantially circular and wherein the cross-sectional shape of the chamber at the second longitudinal position thereof is elongate, such as oval,

having a first dimension being at least 2, such as at least 3, preferably at least 4 times a dimension at an angle to the first dimension.

72. (New) A combination according to claim 70, wherein the cross-sectional shape of the chamber at the first longitudinal position thereof is at least substantially circular and wherein the cross-sectional shape of the chamber at the second longitudinal position thereof comprises two or more at least substantially elongate, such as lobe-shaped, parts.

73. (New) A combination according to claim 70, wherein a first circumferential length of the cross-sectional shape of the cylinder at the first longitudinal position thereof amounts to 80-120%, such as 85-115%, 90-110, such as 95-105, 98-102%, of a second circumferential length of the cross-sectional shape of the chamber at the second longitudinal position thereof.

74. (New) A combination according to claim 73, wherein the first and second circumferential lengths are at least substantially identical.

75. (New) A combination according to claim 59 wherein the container comprises an elastically deformable material comprising reinforcement means.

76. (New) A combination according to claim 75, wherein the reinforcement means comprises fibers.

77. (New) A combination according to claim 59 wherein the foam or fluid is adapted to provide, within the container, a pressure higher than the highest pressure of the surrounding atmosphere during translation of the piston means from the first longitudinal position of the chamber to the second longitudinal position thereof or vice versa.

78. (New) A combination according to claim 55, wherein the cross-sectional area of said chamber at the second longitudinal position thereof is 95% or less of the cross-sectional area of said chamber at the first longitudinal position thereof.

79. (New) A combination according to claim 78, wherein the cross-sectional area of said chamber at the second longitudinal position thereof is between 95% and 15% of the cross-sectional area of said chamber at the first longitudinal position thereof.

80. (New) A combination according to claim 78, wherein the cross-sectional area of said chamber at the second longitudinal position thereof is 95-70% of the cross-sectional area of said chamber at the first longitudinal position thereof.

81. (New) A combination according to claim 78, wherein the cross-sectional area of said chamber at the second longitudinal position thereof is approximately 50% of the cross-sectional area of said chamber at the first longitudinal position thereof.

82. (New) A piston-chamber combination comprising an elongate chamber bounded by an inner chamber wall and comprising a piston means in the chamber to be sealingly movable in the chamber,

the piston means being movable in the chamber at least from a first longitudinal position thereof to a second longitudinal position thereof,

the chamber comprising an elastically deformable inner wall along at least part of the length of the chamber wall between the first and second longitudinal positions,

the chamber having, at the first longitudinal position thereof when the piston means is positioned at that position, a first cross-sectional area, which is larger than a second cross-sectional area at the second longitudinal position of the chamber when the piston means is positioned at that position, the change in cross-sections of the chamber being at least substantially continuous between the first and second longitudinal positions when the piston means is moved between the first and second longitudinal positions.

83. (New) A combination according to claim 82, wherein the piston means is made of an at least substantially incompressible material.

84. (New) A combination according to claim 82 wherein the piston means has, in a cross section along the longitudinal axis, a shape tapering in a direction from the first longitudinal position of the chamber to the second longitudinal position thereof.

85. (New) A combination according to claim 84 wherein the angle between the wall and the central axis of the cylinder is at least smaller than the angle between the wall of the taper of the piston means and the central axis of the chamber.

86. (New) A combination according to claim 82, wherein the chamber comprises:

an outer supporting structure enclosing the inner wall and
a fluid held by a space defined by the outer supporting structure and the inner wall.

87. (New) A combination according to claim 86 wherein the space defined by the outer structure and the inner wall is inflatable.

88. (New) A combination according to claim 82 wherein the piston means comprises an elastically deformable container comprising a deformable material and designed according to claim 61.

89. (New) A pump for pumping a fluid, the pump comprising:
a combination according to claim 55,
means for engaging the piston means from a position outside the chamber,
a fluid entrance connected to the chamber and comprising a valve means, and
a fluid exit connected to the chamber.

90. (New) A pump according to claim 89 wherein the engaging means have an outer position where the piston means is at the first longitudinal position of the chamber, and an inner position where the piston means is at the second longitudinal position of the chamber.

91. (New) A pump according to claim 89 wherein the engaging means have an outer position where the piston means is at the second longitudinal position of the chamber, and an inner position where the piston means is at the first longitudinal position of the chamber.

92. (New) A shock absorber comprising:

a combination according to claim 55,

means for engaging the piston means from a position outside the chamber, wherein the engaging means have an outer position where the piston means is at the first longitudinal position of the chamber, and an inner position where the piston means is at the second longitudinal position.

93. (New) A shock absorber according to claim 92, further comprising a fluid entrance connected to the chamber and comprising a valve means.

94. (New) A shock absorber according to claim 92 further comprising a fluid exit connected to the chamber and comprising a valve means.

95. (New) A shock absorber according to claim 92 wherein the chamber and the piston means form an at least substantially sealed cavity comprising a fluid, the fluid being compressed when the piston means moves from the first to the second longitudinal positions of the chamber.

96. (New) A shock absorber according to claim 92 further comprising means for biasing the piston means toward the first longitudinal position of the chamber.

97. (New) An actuator comprising:
a combination according to claim 55,
means for engaging the piston means from a position outside the
chamber,
means for introducing fluid into the chamber in order to displace the
piston means between the first and the second longitudinal positions of the
chamber.
98. (New) An actuator according to claim 97, further comprising a
fluid entrance connected to the chamber and comprising a valve means.
99. (New) An actuator according to claim 97, further comprising a
fluid exit connected to the chamber and comprising a valve means.
100. (New) An actuator according to claim 97 further comprising
means for biasing the piston means toward the first or second longitudinal
position of the chamber.
101. (New) An actuator according to claim 97, wherein the
introducing means comprise means for introducing pressurized fluid into the
chamber.

102. (New) An actuator according to claim 97 wherein the introducing means are adapted to introduce a combustible fluid, such as gasoline or diesel, into the chamber, and wherein the actuator further comprises means for combusting the combustible fluid.

103. (New) An actuator according to claim 97 further comprising a crank adapted to translate the translation of the piston means into a rotation of the crank.